US ARMY CORPS
OF ENGINEERS
New England District

Contract No. DACW33-01-D-0004
Delivery Order No. 13
September 2002

Final Report

Task 6
Alternative Site Screening

Long Island Sound Dredged Material Disposal Site Designation Environmental Impact Statement

Final Report

Alternative Site Screening

Task 6 – Alternative Site Screening
Long Island Sound Dredged Material Disposal Site
Designation Environmental Impact Statement

Contract Number DACW33-01-D-0004
Delivery Order 13

to

U.S. Army Corps of Engineers
North Atlantic Division
New England District
696 Virginia Road
Concord MA 01742-2751

September 27, 2002

Battelle
397 Washington Street
Duxbury MA 02332
(781) 934-0571

Battelle
. . . Putting Technology To Work

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

1.0 INTRODUCTION

This report summarizes the process and results for the selection of alternative open water dredged material disposal sites to be evaluated in an environmental impact statement (EIS) for the designation of dredged material disposal sites in western and central Long Island Sound, Connecticut and New York.

1.1 Authority

The U.S. Environmental Protection Agency (EPA) has the authority to manage the disposal of dredged material in open water, including the designation of open water dredged material disposal sites (ODMDS) under section 102(c) of the Marine Protection, Research, and Sanctuaries Act (MPRSA) and 40 CFR 230.80 of EPA's regulations under section 404 of the Clean Water Act. EPA Region 1 (New England) and Region 2 (Mid-Atlantic) jointly manage dredged material disposal in Long Island Sound.

1.2 Background

In June 1999, the EPA Region 1 published a Notice of Intent (NOI) in the Federal Register to prepare a federal EIS to evaluate potential dredged material disposal site(s) within Long Island Sound (LIS; FR 64:106, June 3, 1999). As written in June 1999, the EIS would provide an evaluation of the existing historically used sites known as the Western Long Island Sound Disposal Site (WLIS), the Central Long Island Disposal Site (CLIS), and the eastern Long Island disposal sites, the Cornfield Shoals Disposal Site and the New London Disposal Site. Additionally, the EIS would evaluate alternatives, including other open water disposal sites, other types of dredged material disposal and management options, and the no action alternative. The alternative ODMDS are to be developed and identified as part of the NEPA process.

In March 2002, the U.S. Army Corps of Engineers (USACE) and EPA made a determination to narrow the Zone of Siting Feasibility (ZSF), the area in which ODMDS may be located, to consider, initially, the potential designation of one or more dredged material disposal sites in the western and central regions of Long Island Sound while deferring review of the eastern region to a Supplemental EIS to be prepared at a later date. The primary reasons for the decision were:

- The disposal needs and alternatives of the central and western Long Island Sound regions are geographically and environmentally separate from those of the eastern Long Island Sound region;
- The need to assess, in a timely manner, the appropriateness of maintaining operational continuity and continued use of a site serving the needs of the central LIS region, and;
- This change in scope would not preclude consideration of a comprehensive range of alternatives for disposal site(s) for all three LIS regions (A. Rodney, EPA Region 1, email communication)

The ZSF for central and western Long Island Sound runs from Throgs Neck in the west to a transect from Guilford CT to Mattituck NY in the east (Figure 1). The location of the eastern border of the revised ZSF is based on a generalized physiographic boundary between the central and eastern LIS (the western border remains at Throgs Neck). This eastern boundary is marked

by a change in sediment texture and depth representing the transition from the depositional basin of the central LIS into the more active region of the Mattituck Sill and eastern basin (USGS 2000) and is defined by a line drawn from Mulberry Point (Guilford) CT to Mattituck Point NY. It has broad recognition as the transition line between two geographic regions of LIS. The choice of this particular location for the revised ZSF meets the needs of the dredging centers in the Central and Western Sound and restricts the ZSF to the Central and Western Basins. This location also retains two current disposal sites (WLIS and CLIS) for consideration. The outer limits of the zone represent a reasonable haul distance for small marinas and boatyards from each dredging center.

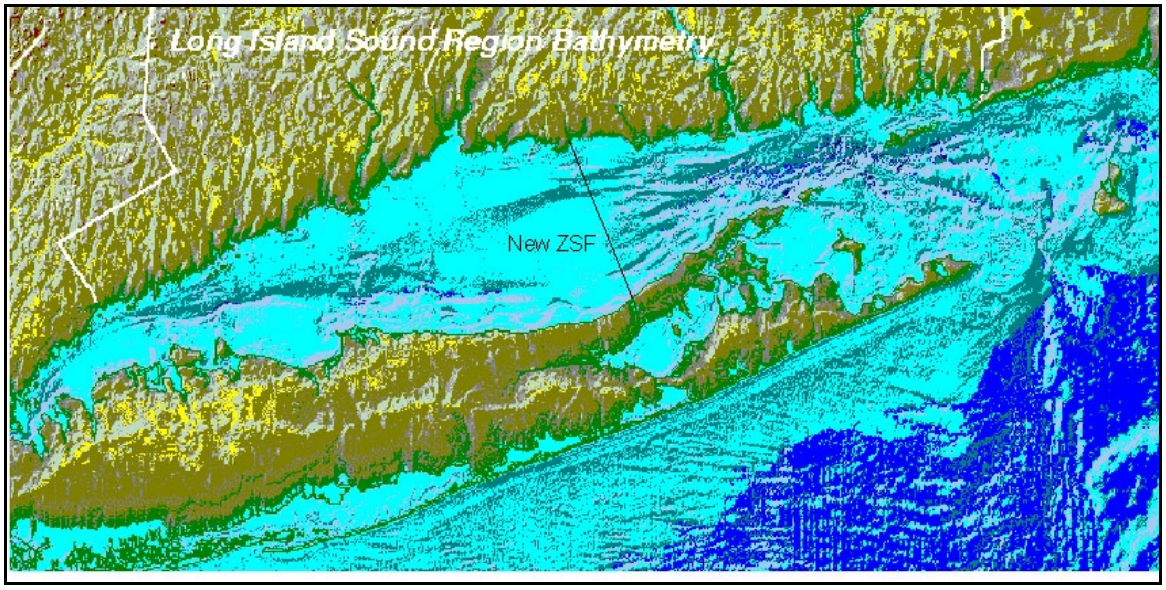

Figure 1. Zone of Siting Feasibility for Western and Central Long Island Sound.

Battelle, under Contract No. DACW33-01-D-0004 Delivery Order 0013 to the USACE, was tasked with developing a screening process under which candidate siting areas for alternative ODMDS to the CLIS and WLIS within this revised ZSF would be developed. This report presents the results of this process.

2.0 SITE SCREENING PROCESS

The EPA, in consultation with other federal and state agencies, selects alternative ODMDS to the WLIS and CLIS for evaluation in the site designation EIS following guidance in MPRSA. MPRSA lists five general and eleven specific required considerations in the evaluation and designation of ODMDS (40 CFR 228.5 and 40 CFR 228.6, respectively, Table 1). Additionally, an interagency group of federal and state agencies prepared a summary of evaluation factors for site screening, which included evaluation factors for screening open water sites (EPA and USACE 1999). To facilitate the selection of alternative ODMDS for Long Island Sound, the environmental considerations from 40 CFR 228.5 and 228.6 and EPA and USACE 1999 were organized to develop a screening process that would

- Identify areas within the revised ZSF not acceptable for locating an open water disposal site designated under the MPRSA (Tier 1 screening), and

- Identify specific alternative disposal site(s) within the acceptable area(s) for further evaluation in the EIS (Tier 2 screening).

The environmental considerations organized to facilitate the screening of candidate areas for alternative open ODMDS are presented in Table 2.

Table 1. Required considerations in the evaluation and designation of ocean dredged material disposal sites (MPRSA 228.5 and 228.6).

MPRSA Section	MPRSA Regulation
228.5(a)	The dumping of dredged material into the ocean will be permitted only at sites or in areas selected to minimize the interference of disposal activities with other activities in the marine environment, particularly avoiding areas of existing fisheries or shellfisheries, and regions of heavy commercial or recreational navigation.
228.5(b)	Locations and boundaries of disposal sites will be so chosen that temporary perturbations in water quality or other environmental conditions during initial mixing caused by disposal operations anywhere within the site can be expected to be reduced to normal ambient seawater levels or to undetectable contaminant concentrations of effects before reaching any beach, shoreline, marine sanctuary, or known geographically limited fishery or shellfishery.
228.5(c)	If at any time during or after disposal site evaluation studies, it is determined that existing disposal sites presently approved on an interim basis for ocean dumping do not meet the criteria or site selection set forth in Section 228.5 through 228.6, the use of such sites will be terminated as soon as suitable alternate disposal sites can be designated.
228.5(d)	The sizes of ocean disposal sites will be limited in order to localize for identification and control any immediate adverse impacts and permit the implementation of effective monitoring and surveillance programs to prevent adverse long-range impacts. The size, configuration, and location of any disposal site will be determined as a part of the disposal site evaluation or designation, site study.
228.5(e)	USEPA will, wherever feasible, designate ocean dumping sites beyond the edge of the Continental shelf and other such sites that have been historically used.
228.6(a)(1)	Geographical position, depth of water, bottom topography and distance from coast;
228.6(a)(2)	Location in relation to breeding, spawning, nursery, feeding or passage areas of living resources in adult or juvenile phases;
228.6(a)(3)	Location in relation to beaches and other amenity areas;
228.6(a)(4)	Types and quantities of wastes (dredged material) proposed to be disposed of, and proposed methods of release, including methods of packaging the waste (dredged material), if any;
228.6(a)(5)	Feasibility of surveillance and monitoring;
228.6(a)(6)	Dispersal, horizontal transport and vertical mixing characteristics of the area, including prevailing current direction and velocity, if any;
228.6(a)(7)	Existence and effects of current and previous discharges and dumping in the area (including cumulative effects);
228.6(a)(8)	Interference with shipping, fishing, recreation, mineral extraction, desalination, fish and shellfish culture, areas of special scientific importance and other legitimate uses of the ocean;
228.6(a)(9)	The existing water quality and ecology of the site as determined by available data or by trend assessment or baseline surveys;
228.6(a)(10)	Potentiality for development or recruitment of nuisance species in the disposal site;
228.6(a)(11)	Existence at or in close proximity to the site of any significant natural or cultural features of historical importance.

Table 2. Ocean dumping reference table for the Western and Central LIS Disposal Site Designation EIS.

Ocean Dumping Regulation	Key Words and Phrases from 40 CFR 228	LIS Evaluation Factors (EPA and USACE 1999)	Screening Tier
40 CFR 228.5(a-e): General Considerations for the Selection of Sites			
228.5(b)	Perturbations to the environment during initial mixing	Disposal Site Feasibility and Stability	1
228.5(e)	Designating historically used sites	Disposal Sites	1
228.5(a)	Interference with other activities: *avoiding areas of existing fisheries or shellfisheries, and regions of heavy commercial or recreational navigation*	Navigation considerations Existing Marine Habitats Commercial and Recreation Fisheries	1 1 1
228.5(d)	Limiting site size for monitoring and surveillance	Accessibility	2
228.5(c)	closure of interim ODMDSs	N/A	N/A
40 CFR 228.6(a)(1-11): Specific Considerations for Site Selection			
228.6(a)(3)	Location relative to beaches and amenities	N/A	1
228.6(a)(6)	Site dispersion, transport, and mixing characteristics	Disposal Mound Height Limit Disposal Site Feasibility and Stability Duration of Potential Adverse Impacts Site Characteristics	1 1 2 2
228.6(a)(8)	Interference with other uses	Site Use Conflicts Conservation Areas Economic Impacts	1 1 2
228.6(a)(1)	Geography, depth, topography, distance from coast	State Waters/Basins Site Characteristics	1 2
228.6(a)(2)	Location relative to living resources: *breeding, spawning, nursery, feeding, or passage areas of living resources in adult or juvenile phases*	Endangered Species	2
228.6(a)(9)	Existing water quality and ecology of site	Existing Habitat(s) at Site Recreational Uses Essential Fish Habitats	2 2 2
228.6(a)(4)	Types and quantities of wastes and disposal methods	Capacity and Area of Impact	2
228.6(a)(11)	Proximity to historical features	Cultural/Archaeological Resource Sites or Historic Districts Economic Impacts	2 2
		Site Protection Requirements	2

Using available data primarily drawn from the Connecticut Department of Environmental Protection (CTDEP), but also from the U.S. Geological Survey (USGS) and the USACE DAMOS project, GIS data layers were created to address each consideration. For Tier 1, each layer was then used to rule out areas unacceptable for open water disposal. The final Tier 1 screening results in a map showing areas screened from consideration as well as the resulting area to be considered for Tier 2 consideration. A similar process using GIS data layers was used to consider potential alternative sites using the Tier 2 criteria.

The alternative ODMDS were selected at an interagency meeting held in Hartford CT, May 16, 2002 at the offices of the Connecticut Department of Environmental Protection (CTDEP). The interagency group included representatives from EPA Regions 1 and 2, USACE, National Marine Fisheries Service (NMFS), CTDEP, New York State Department of Environmental Conservation (NYSDEC), and New York State Department of State (NYSDOS). Mr. M. Ludwig from NMFS facilitated the interagency group meeting. Battelle, with input from Battelle subcontractor, Coastal Vision Inc., assisted the USACE presentation.

2.1 Tier 1 Screening Approach and Results

The revised ZSF was agreed upon by the federal and state agencies at the May 16, 2002 meeting. Tier 1 screening defined areas within the revised ZSF not acceptable for locating an open water disposal site designated under the MPRSA, reducing the area considered for Tier 2 screening. The Tier 1 screening considerations are presented in the order discussed in the meeting.

2.1.1 NY/CT State Waters (MPRSA 228.6(a)(1))

The state boundary between New York and Connecticut runs roughly east west through the center of LIS from Greenwich, Connecticut in the west, extending to the edge of the ZSF in the east (Figure 2). The consensus of the interagency group was that, for site screening purposes, both New York and Connecticut state waters should be considered equally. Thus, this consideration was not used to limit the acceptable area of the ZSF. The NYSDEC and NYSDOS agreed to provide State of New York GIS layers relative to the siting considerations; data that will be evaluated in the EIS.

2.1.2. Stability and Feasibility (MPRSA 228.5(b))

It was the consensus of the interagency group that the preferred areas for consideration for the alternative ODMDS would be "containment areas," as opposed to "dispersal areas," which are often preferred in other regions of the United States. It was agreed that, for Tier 1 screening purposes, water depth would be a surrogate for sediment stability. Waters shallower than 18 meters deep were eliminated from consideration because wave and storm driven bottom currents in these shallow depths in LIS frequently are strong enough to resuspend bottom sediments (Figure 3). Feasibility of monitoring and assessment in the ZSF was not considered to be an important consideration for Tier 1 screening.

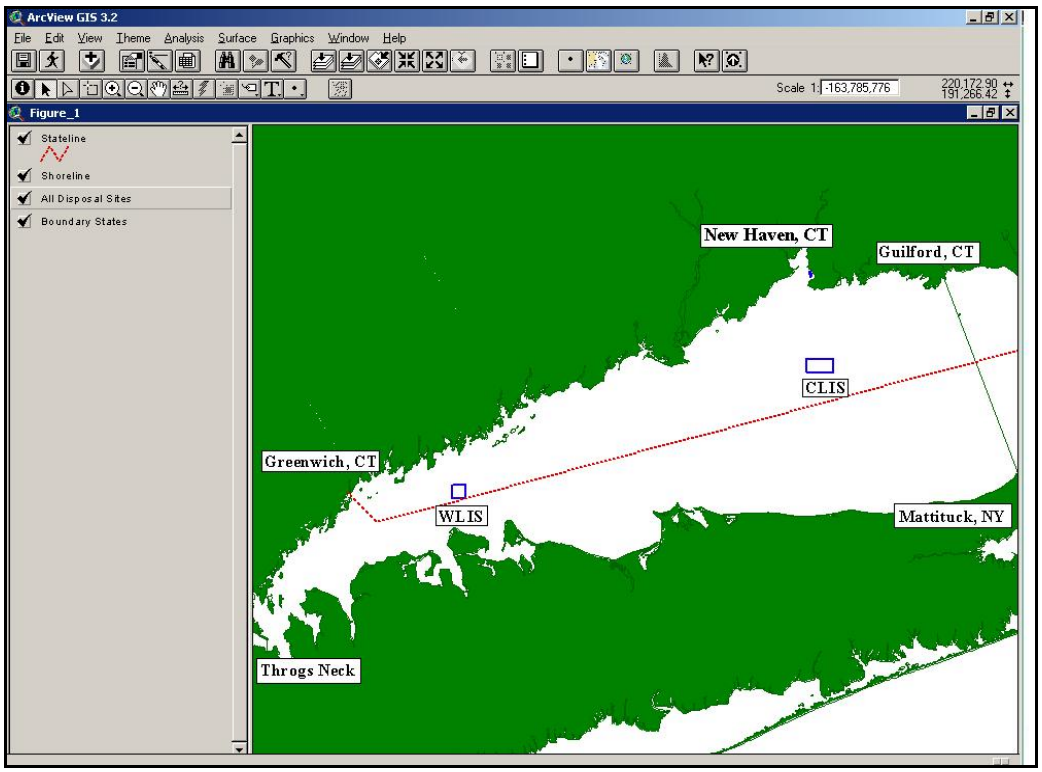

Figure 2. The New York/Connecticut Stateline Runs Longitudinally through the Center of LIS from Greenwich CT Extending to the Edge of the ZSF in the East.

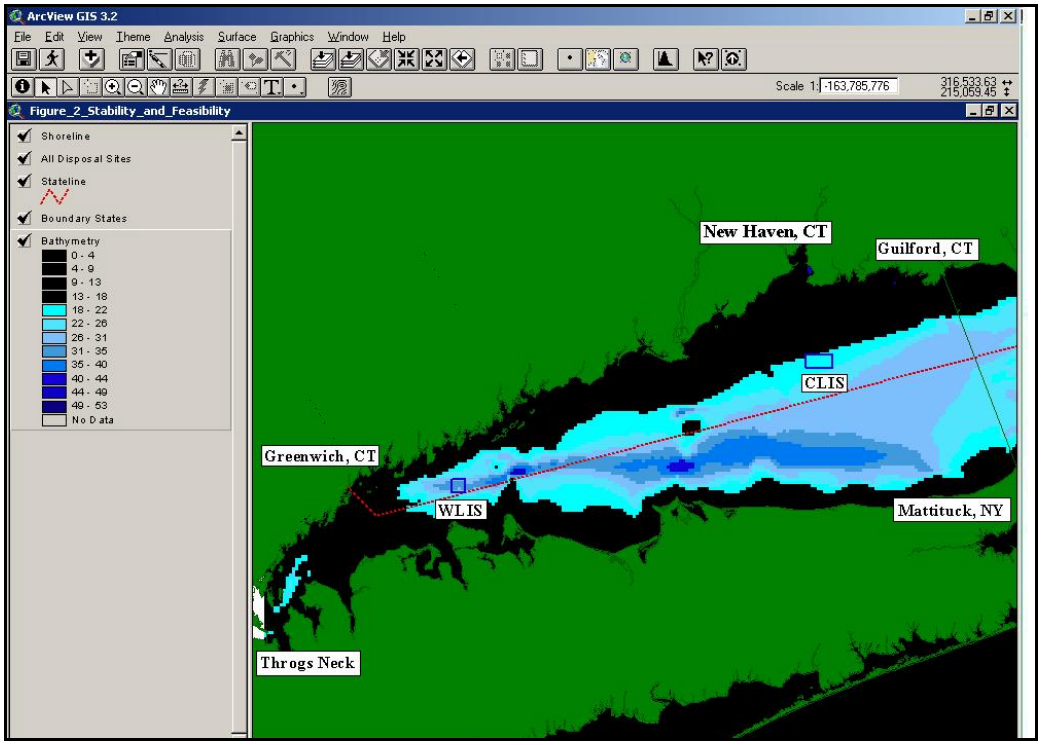

Figure 3. The 18-Meter Contour Was Considered the Depth Below which Bottom Sediments would not be Resuspended from Storm and Wave Surge. Areas in the ZSF Shallower than 18 Meters were Removed from Consideration.

2.1.3. Areas with Conflicting Uses (MRPSA 228.6(a)(8))

Conflicting use considerations included

- Beaches and amenities (MRPSA Criteria 228.6(a)(3))
- Utilities (pipelines, cable areas, etc), and
- Conservation areas (sanctuaries, wildlife refuges, national seashores, parks, fish havens, artificial reefs)

Figure 4 identifies these considerations. Data on beaches and amenities and conservation areas were only available from the State of Connecticut. Data on pipelines and utility cable tracks, including both Connecticut and New York state waters, were also provided by the State of Connecticut.

The interagency group agreed that ODMDS alternatives would not be placed near beaches, state or federal reserve areas, artificial reefs, or other conservation areas.

The State of Connecticut and local authorities manage several beaches and state parks in coastal regions of the Connecticut. Additionally, the Stewart McKinney National Wildlife Refuge comprises several locations along the Connecticut coast. Hard-bottom (rock outcrop) areas in LIS are considered fish havens and will also be avoided (identified as reefs in Figure 4). The interagency group also agreed that pipeline and cable areas, including approved projects yet to be constructed, would be avoided. Data for several new pipeline or cable projects were not available before the meeting. It was agreed that the existing information was sufficient for screening but that this data layer would be updated as part of the EIS process.

It was noted that there are several areas in the New York waters of LIS that contain artificial reefs. Specific information on these reefs, as well as data on New York beaches and other resource areas will be obtained before the affected environment and alternatives analysis sections of the EIS are prepared.

2.1.4. Shellfisheries areas (MPRSA 228.5(a))

It was agreed upon by the interagency group that shellfishery resource areas would not be considered for ODMDS alternatives. These areas for Connecticut waters are shown in Figure 5. Shellfishery resource areas for State of New York waters will be analyzed in the EIS.

2.1.5. Interference with Navigation (MPRSA 228.5(a))

Interference with navigation was not considered important for Tier 1 screening and was not discussed further. The interagency group agreed that this topic would be addressed in the EIS and that the additional data related to this consideration would be needed.

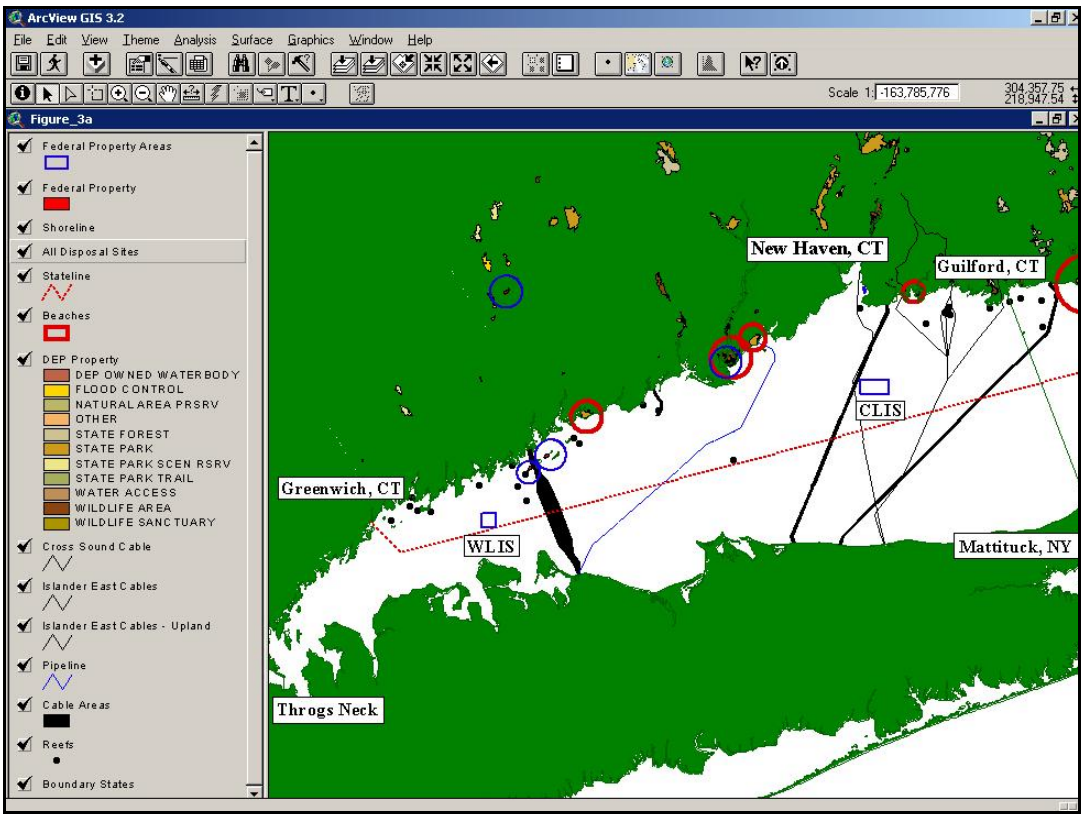

Figure 4. Areas with Conflicting Use will not be Considered for ODMDS Alternative Siting.

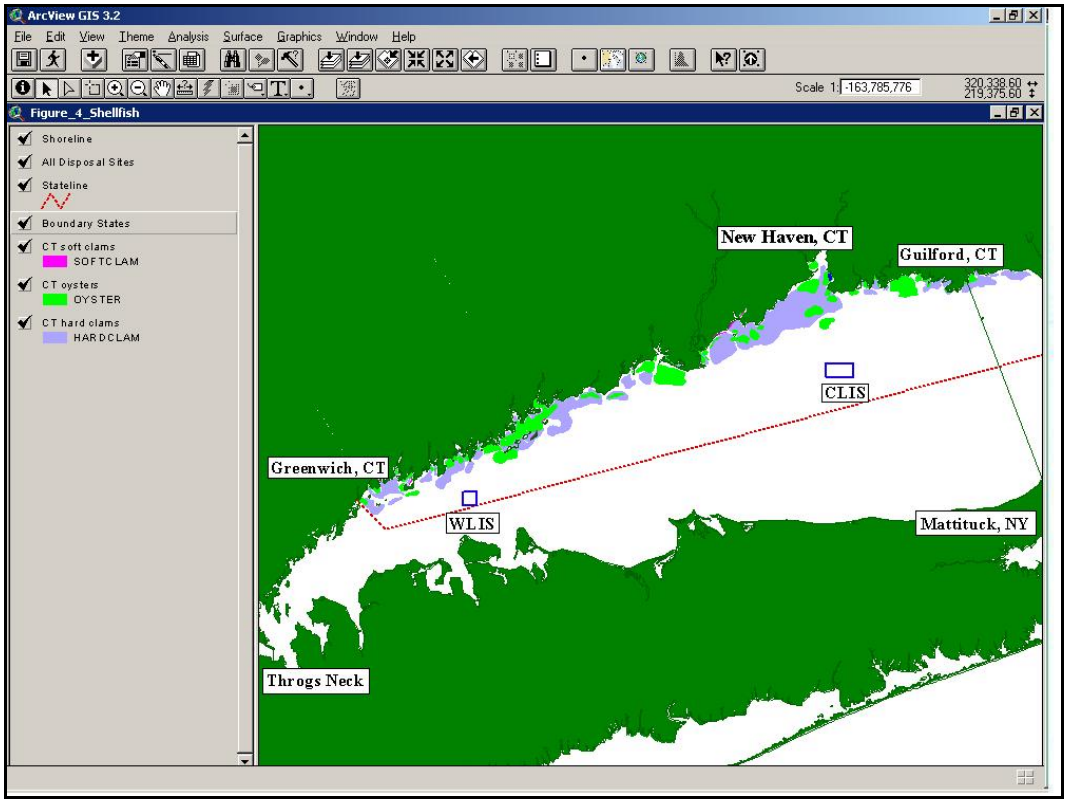

Figure 5. Shellfishery Areas will not be Considered for ODMDS Alternatives Siting.

2.1.6. Valuable Marine Habitats (MPRSA 228.5(a))

The interagency group agreed that surface sediment texture data could be used to discuss LIS marine habitats. Hardbottom and gravel areas of LIS are considered to be important marine habitats because they provide topographic relief important to living resources. These areas will not be considered for siting alternative ODMDS. The interagency group agreed that other bottom types would not be important for Tier 1 screening but may enter Tier 2 discussions. LIS surface sediment texture data are presented in Figure 6.

2.1.7. Areas of High Dispersion Potential (MPRSA 228.6(a)(6))

The interagency group again agreed that the alternative ODMDS for WLIS and CLIS would be containment sites. Thus, areas with high potential for dispersal after disposal (erosional areas) would be not be considered. The areas removed from consideration include the areas of erosion and areas of coarse-grained sediments (Figure 7). Bottom areas classified as sorting and reworking (resulting from biological, not physical processes) would be considered gray areas – not screened out in Tier 1 but given special consideration in Tier 2 (Figure 7). Additionally, the interagency group agreed that the boundaries and dimensions of alternative ODMDS must be adequate to allow initial mixing to be completed inside site boundaries (a Tier 2 consideration).

2.1.8. Summary of Tier 1 Considerations

Figure 8 summarizes the Tier 1 screening considerations. The areas shaded in black are removed from consideration. The areas classified as "sorting and reworking" are shaded gray were not screened out under Tier 1 but will be given special consideration under Tier 2. The areas of the ZSF considered for Tier 2 evaluation are shaded gray or clear (white).

2.2 Tier 2 Screening Approach and Results

The objective of the Tier 2 screening is the identification of specific alternative ODMDS site locations. The Tier 2 screening considerations are presented in the order discussed in the May 16, 2002 interagency meeting.

2.2.1. Historic Dump Sites (MPRSA 228.5(d))

There was strong agreement among members of the interagency group that preference should be given to historical dump sites for siting alternative ODMDS in LIS. Use of previously used dump sites would avoid modifying the bottom type and habitat of additional areas of the Sound and, additionally, could address potential sediment quality issues resulting from historic use of these sites. The historic dump sites in LIS are presented in Figure 9.

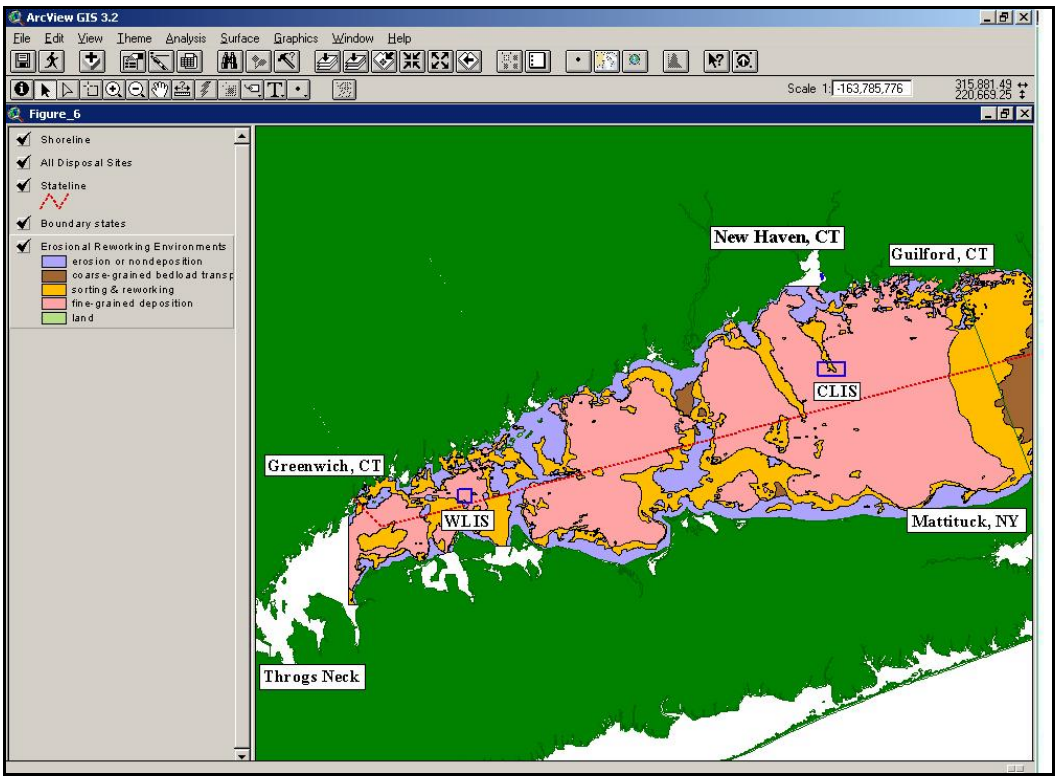

Figure 6. Surface Sediment Texture of LIS.

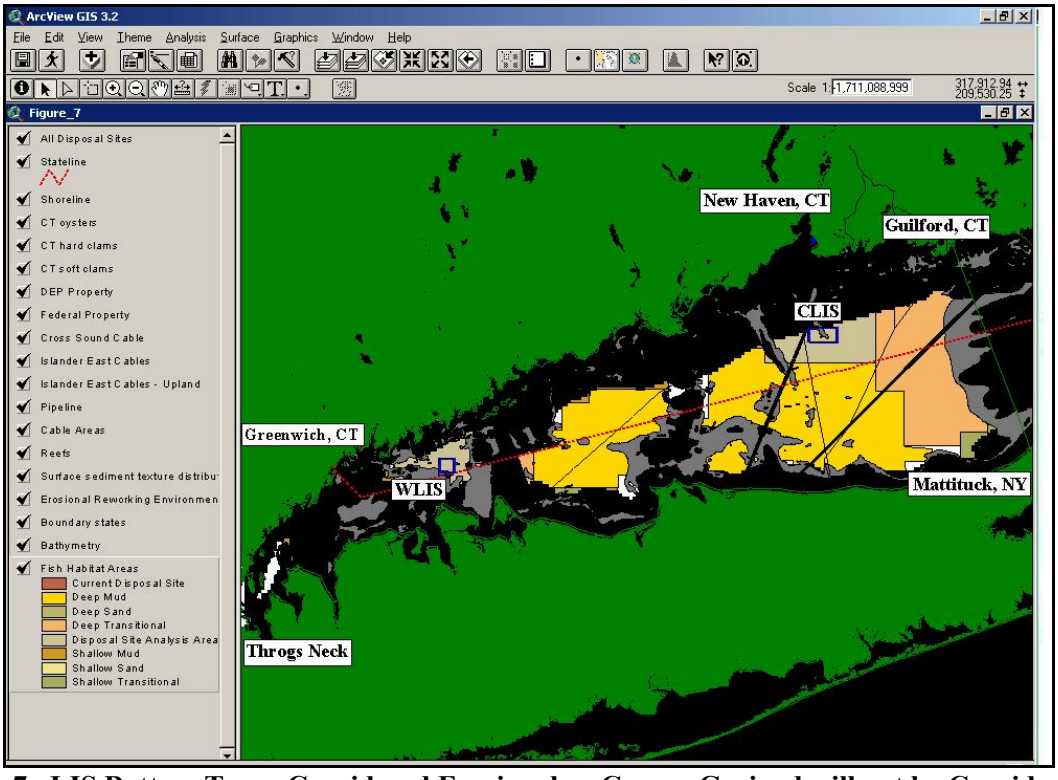

Figure 7. LIS Bottom Types Considered Erosional or Coarse-Grained will not be Considered for ODMDS Siting.

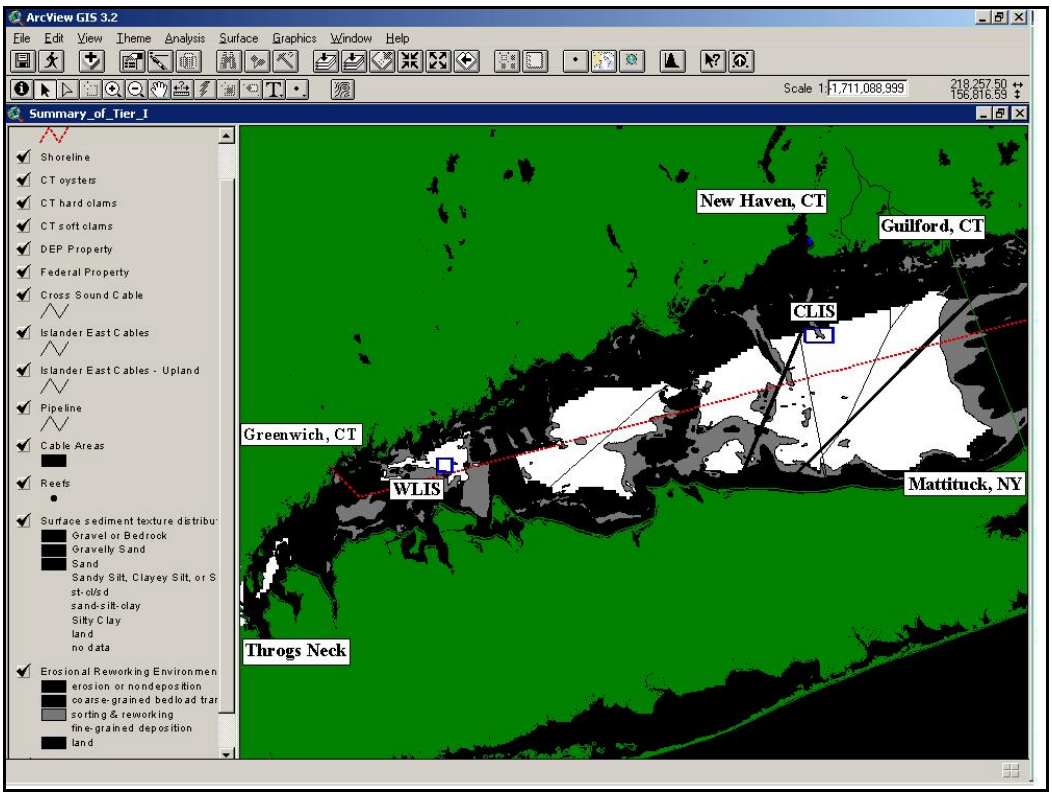

Figure 8. Summary of Tier 1 Screening Considerations. Areas Shaded in Black will be Removed from Consideration for Siting Alternative ODMDS.

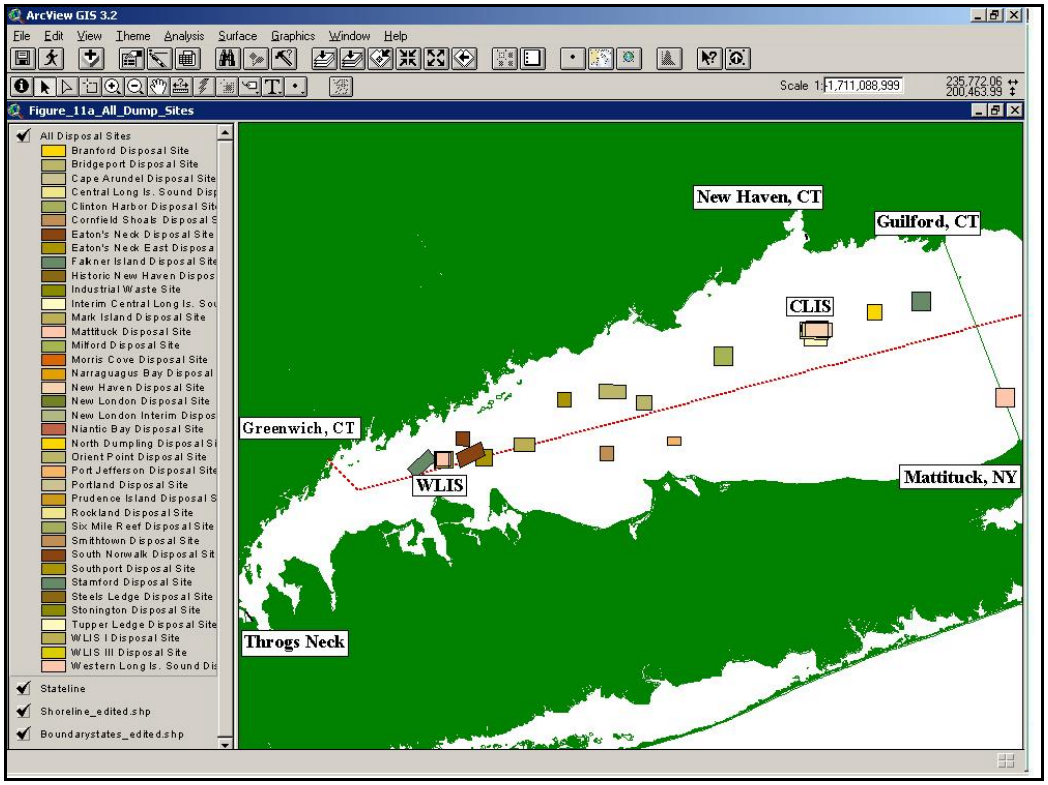

Figure 9. Historical Dump Sites in Long Island Sound.

2.2.2. Minimize Impact to Archeological Resources (MPRSA 228.5(a)(11))

The interagency group agreed that there was not sufficient information on archeological resources at the historical dump sites or other remaining ZSF areas of LIS to use this Tier 2 alternative ODMDS screening consideration. The interagency group agreed upon the importance of conducting appropriate studies to assure protection of important archeological resources in the selected alternative sites. An initial review of the University of Maine shipwreck database is being conducted within the ZSF.

2.2.3. Minimize Impact to Fish Habitats and Fish Concentrations (MPRSA 228.5(a); 228.6(a)(9); 228.6(a)(8))

The interagency group agreed that alternative ODMDS siting should minimize significant impact to fish habitat and fish concentrations. The fish catch-per-unit-effort (CPUE) data provided by CTDEP for spring and fall seasons were reviewed by the interagency group. The CPUE data, while showing that the CPUE in areas of historic dump sites were not different from other areas, did not provide significant insight nor discriminatory power for decision making and will not be used for siting. The interagency group agreed that bottom type fish habitat assessment provided some value as a siting consideration. These data, presented in Figure 10, evaluate sediment texture data (Figure 6) and other data to provide an overview of fish habitat.

The interagency group agreed that there is a need to obtain better information on the lobster fishery locations and intensity (through future meetings with lobster fishers), a need that also applies to the next consideration.

2.2.4. Minimize Impact to Living Resources (Breeding, Spawning, Nursery, Feeding, and Passage Areas) (MPRSA 228.6(a)(3)

The CPUE data and the fish habitat assessment (Figure 10) were the only data available to address these considerations. Again, the CPUE data were not considered significantly discriminatory (i.e., generally consistent CPUE across the ZSF area considered for Tier 2 screening).

2.2.5. Minimize Impacts to Benthic Community (228.6(a)(6)

The interagency group concurred that the benthic community is generally well understood within the ZSF (Figure 11). Ongoing ODMDS monitoring shows recovery to typical LIS benthic communities within short time periods after dredged material disposal at existing sites (ENSR 1998, ENSR 2001, ENSR International 2001). The interagency group agreed that the maintenance of the continuity of benthic community type was important consideration, implying that benthic community habitat should be preserved (i.e., disposal of silt and clay on silt and clay), if possible. The interagency group noted that some of the benthic data at the potential alternative sites are dated and supported the collection of some additional data on sediment characteristics.

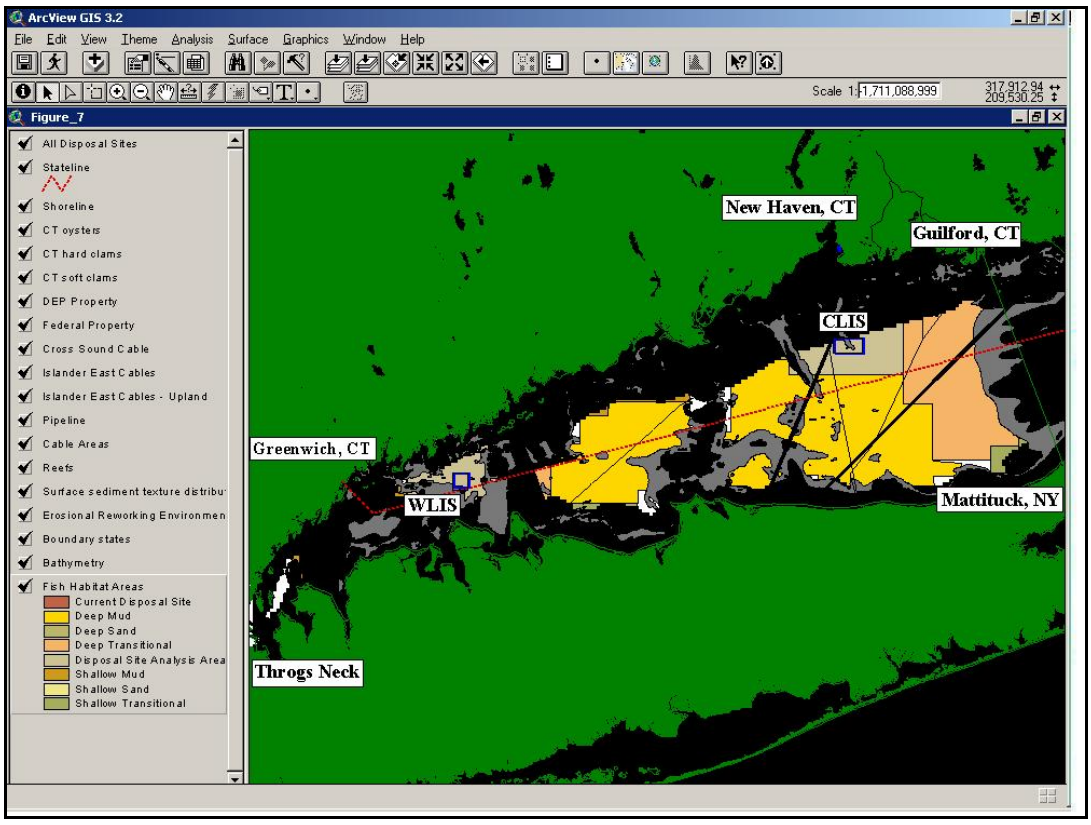

Figure 10. Generalized Fish Habitat Areas of Long Island Sound.

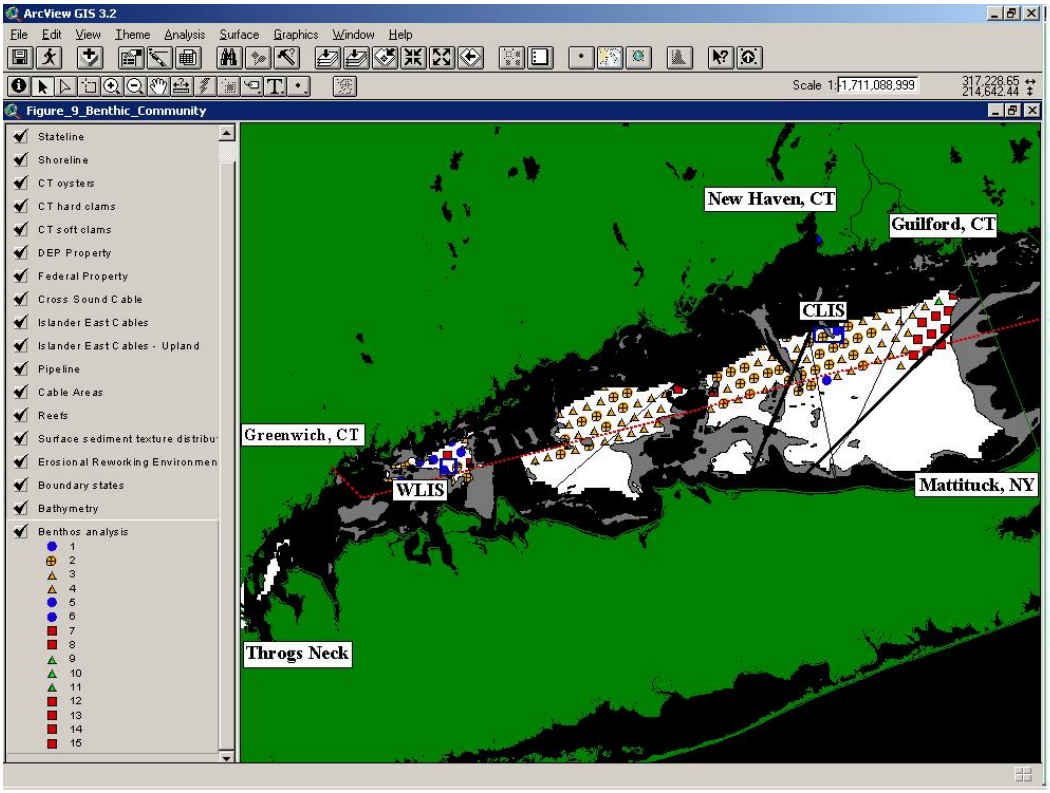

Figure 11. Benthic Community Type Long Island Sound.

2.3 Minimize Impact to Shellfisheries and Fisheries Resource Areas (228.5(a)

This consideration was considered sufficiently similar to those presented in Sections 2.2.3 and 2.2.4 that they were considered together. GIS data for shellfish bed classification provided by CTDEP showed that shellfish collection was prohibited at WLIS and CLIS, as well as additional areas in Connecticut waters (Figure 12). Other areas were classified approved, conditionally approved (with various restrictions), conditionally restricted (with various restrictions), or restricted. The interagency group concurred that alternative ODMDS should not be sited in approved areas.

2.3.1. Consideration of Site Characteristics

Sediment contaminant data, including sediment copper, mercury, and lead, and sediment total organic carbon (TOC) data were reviewed. Although several widely distributed sampling stations contained mercury concentrations above the NOAA ER-M level (Long and Morgan 1990; Long et al. 1995), contaminants throughout the ZSF were generally low. TOC was relatively uniform between 2.5 and 2.9% dry weight through the ZSF. The interagency group noted that some of the sediment contaminant data at the potential alternative sites are dated, thus the collection of some additional data on sediment characteristics was supported by the group.

2.3.2. Summary of Tier 2 Considerations

Based on the Tier1 and Tier 2 considerations, the interagency group concluded that (1) two alternative ODMDS would be selected for further analysis and consideration in the EIS, one as an alternative to WLIS, and one as an alternative to CLIS; and (2) the alternative ODMDS would be chosen from the historic dump sites. Based on size and proximity to WLIS and CLIS, the Bridgeport and Milford Sites were selected (Figures 13, and 14, respectively). While portions of the Milford site are in waters shallower than 18 meters, the interagency group did not consider that a strong argument against selecting the site as an alternative ODMDS. The interagency group agreed that some adjustment of the site boundaries may be required.

3.0 DATA GAPS

The interagency group agreed that additional data will be required at the Bridgeport and Milford sites, including

- Lobster resources and fishery
- Potential site usage (volumes previously dumped)
- Benthic community
- Site chemistry (including organic contaminants)
- Sediment toxicity

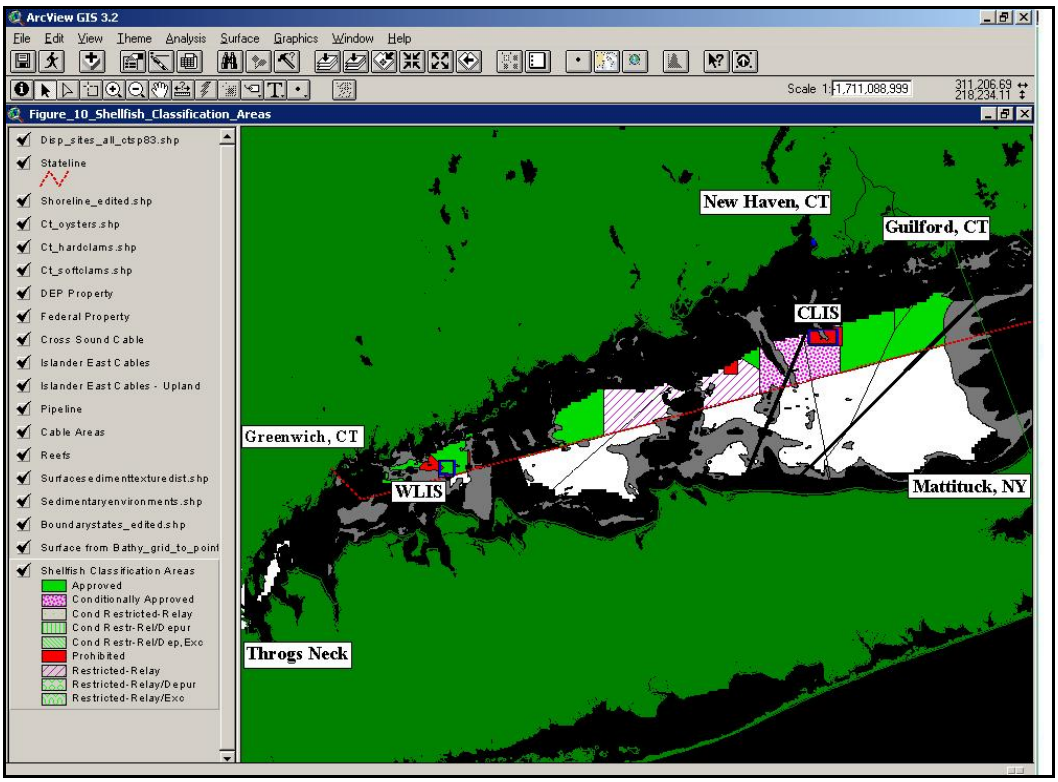

Figure 12. Shellfish Classification Areas in Connecticut Waters (from CTDEP).

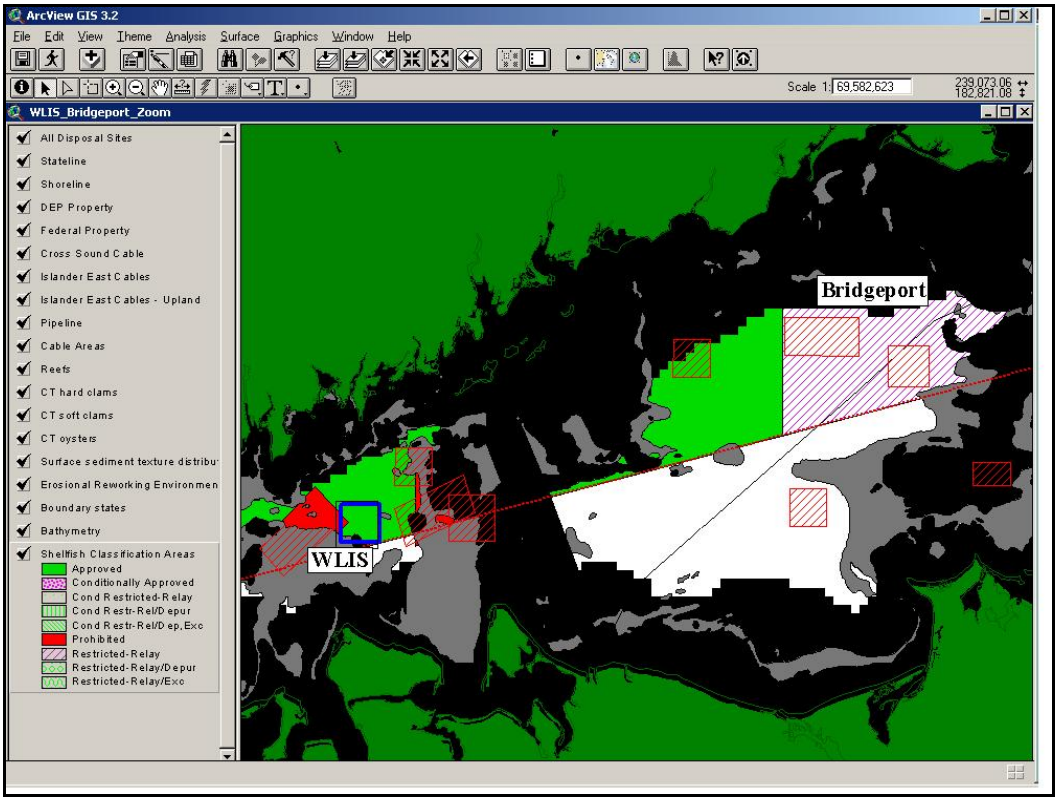

Figure 13. The Historic Bridgeport Dumpsite is Selected as an Alternative to the Western Long Island Sound (WLIS) Disposal Site.

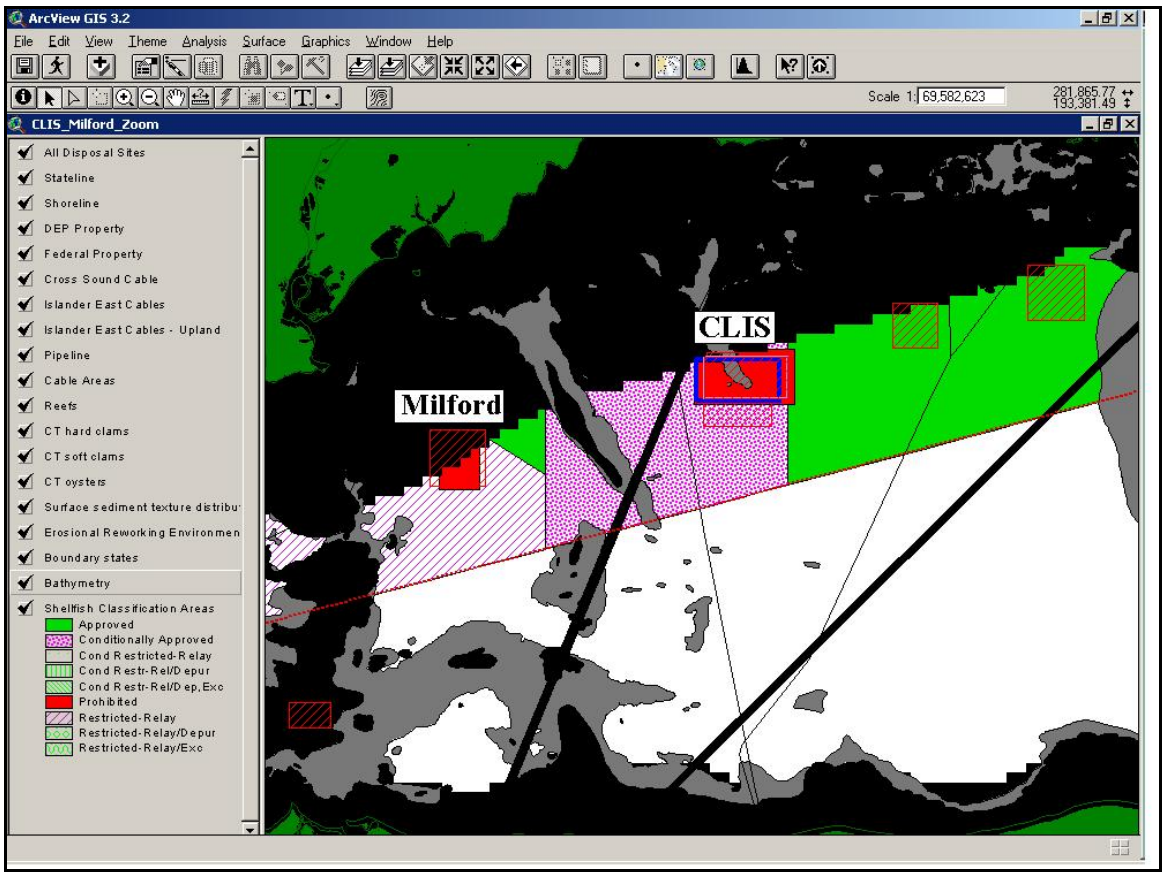

Figure 14. The Historic Milford Dumpsite is Selected as an Alternative to the Central Long Island Disposal Site.

4.0 REFERENCES

A.Rodney. 2002. Update on the Evaluation of Potential Dredged Material Disposal Sites for Long Island Sound. Email communication to Long Island Sound EIS mailing list. U.S. Environmental Protection Agency Region 1, Boston MA. 2 pp.

ENSR. 1998. Long Island Sound Connecticut and New York Site Evaluation Report. Prepared under contract to the U.S. Army Corps of Engineers, New England District. ENSR, Acton MA. Various pages and appendices.

ENSR. 2000. Long Island Sound Dredged Material Disposal EIS, Benthic Community Analysis February and July 2000 Sampling Surveys. Prepared under contract DACW33-96-D-0004 to the U.S. Army Corps of Engineers, New England District. ENSR, Acton MA. Various pages and appendices.

ENSR International. 2001. Long Island Sound Dredged Material Disposal EIS, Benthic Community Analysis February and July 2000 Sampling Surveys. Prepared under contract GSA Contract GS-10F-0115K, September 28, 2001. ENSR, Acton MA. Various pages and appendices.

EPA and USACE. 1999 (online). Long Island Sound Dredged Material Disposal EIS Evaluation Factors for Site Screening, Fact Sheet October 1999 (www.epa.gov/region01/lisreg). U.S. Environmental Protection Agency Region 1, Boston MA. 3 pp.

Long E.R., D.D. Mac Donald, S.L. Smith, and F.D. Calder. 1995. Incidence of Adverse Biological Effects with Ranges of Chemical Concentrations in Marine and Estuarine Waters. *Environmental Management* 19 (1): 81-97.

Long, E.R. and L.G. Morgan. 1990. The Potential for Biological Effects of Sediment-Sorbed Contaminants Tested in the National Status and Trends Program. NOAA Tech. Memo. NOS OMA 62. National Oceanic and Atmospheric Administration, Seattle WA.

USGS. 2000 (online). USGS Open-File Report 00-304, Georeferenced Sea-Floor Mapping and Bottom Photography in Long Island Sound, V. Paskevich and L. Poppe, Eds. U.S. Geological Survey, Woods Hole MA. Various pages.